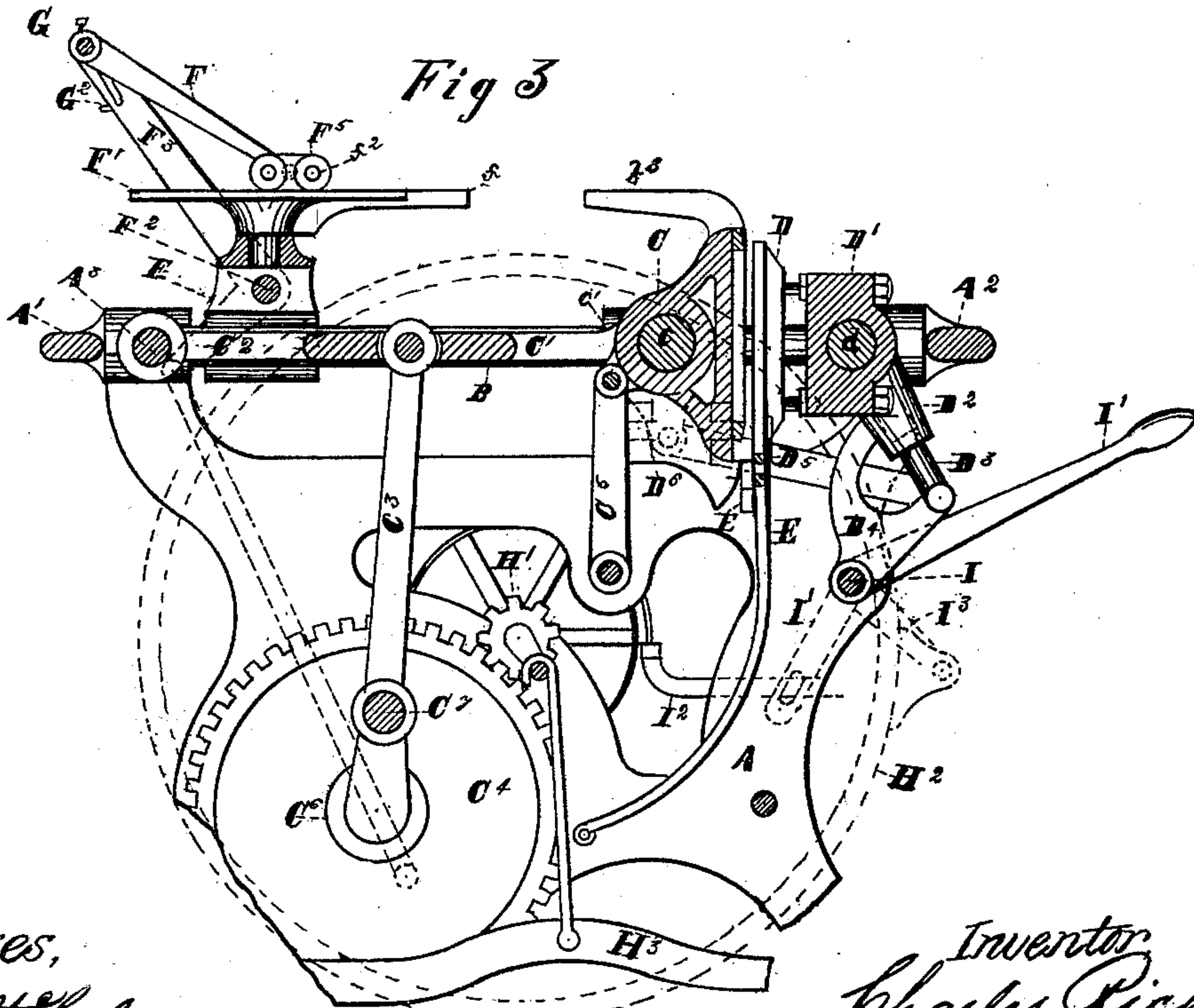
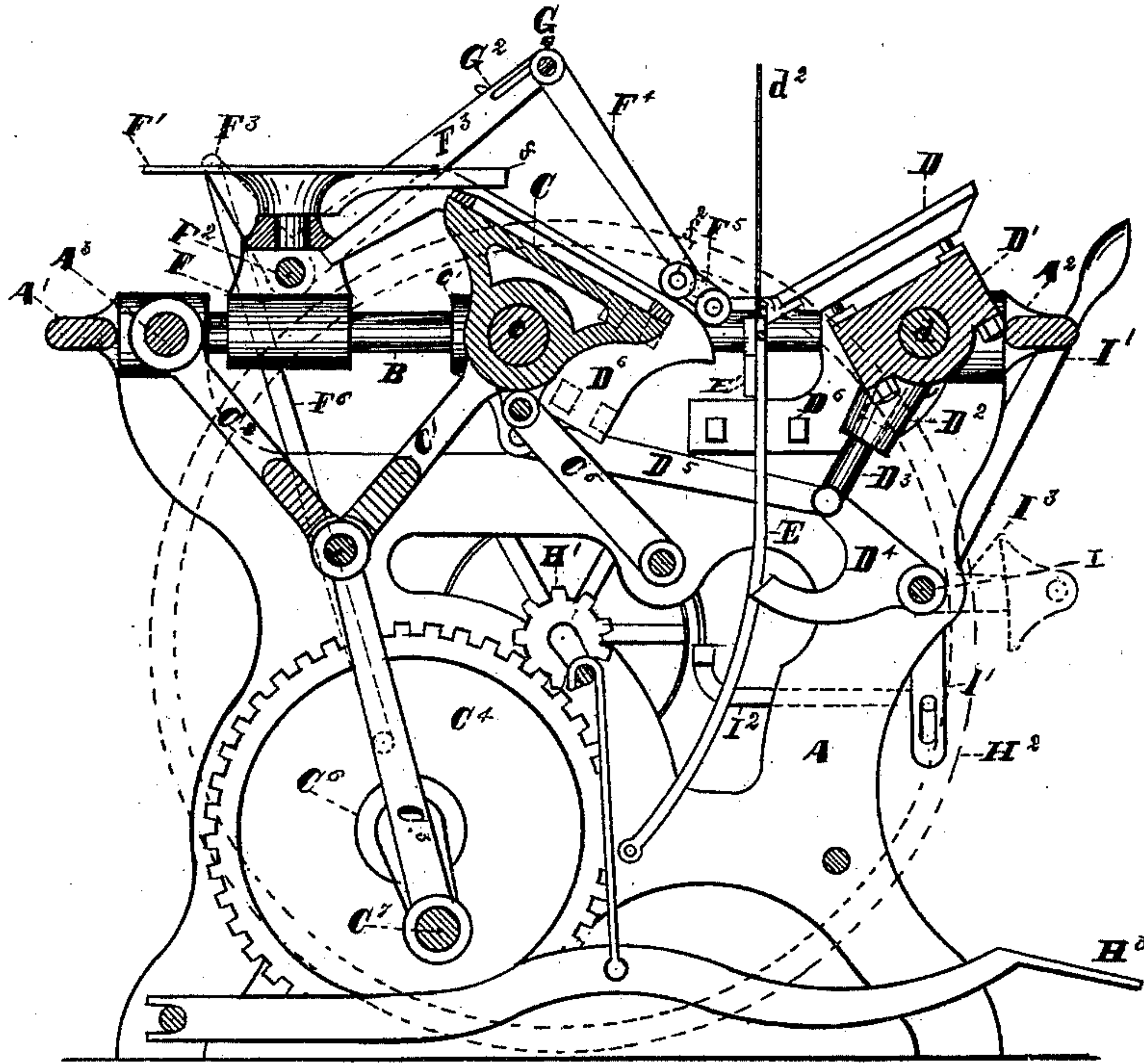


C. RICHARDS.
PRINTING-PRESS.

No. 176,059.

Patented April 11, 1876.



Witnesses,
J. O. McHenry
E. J. Nottingham

Fig 4

Inventor
Charles Richards
By J. J. Rogers & J. J. Rogers
Attorneys

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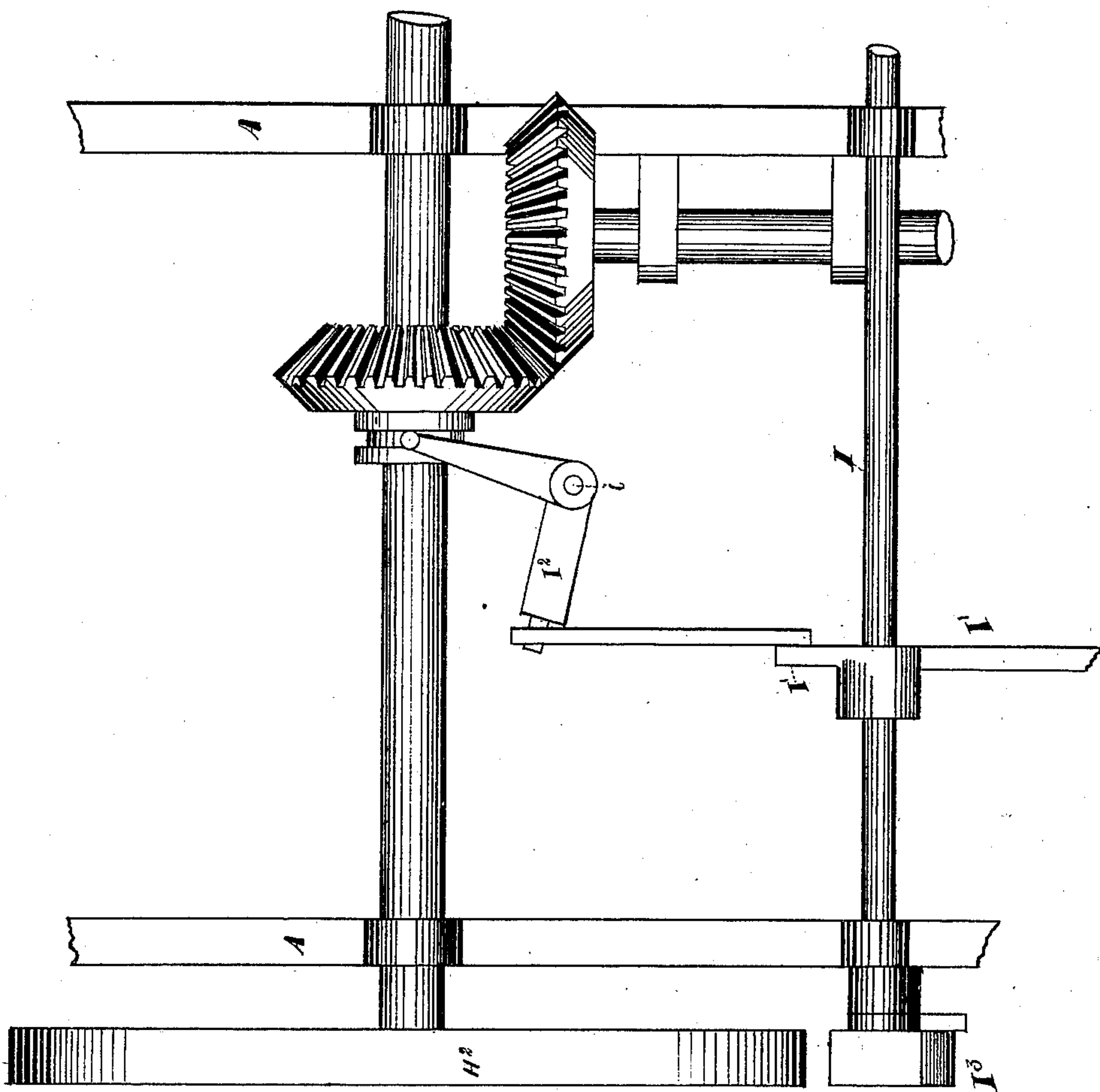


Fig 15

Witnesses.

J. O. McLeary.
G. S. Nottingham

Inventor,

Charles Richards
By Leggett & Leggett
attys

UNITED STATES PATENT OFFICE.

CHARLES RICHARDS, OF CLEVELAND, OHIO.

IMPROVEMENT IN PRINTING-PRESSES.

Specification forming part of Letters Patent No. **176,059**, dated April 11, 1876; application filed December 27, 1875.

To all whom it may concern :

Be it known that I, CHARLES RICHARDS, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Printing-Presses; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in printing-presses.

In the drawings, Figure 1 is a side elevation of a printing-press, according to my invention, showing the platen and bed as separated or open; Fig. 2, a plan view of same; Fig. 3, a view in section, taken through line *xx* of Fig. 2, representing my press with the platen and bed in an open position; Fig. 4, the same, showing the device in the position of taking an impression. Fig. 5 is a detached view, showing one end of the platen with its cylinder, piston, and attached parts. Fig. 6 is a detached sectional view of the same, with the dotted lines illustrating its operation. Fig. 7 is a face view of the inking mechanism; Fig. 8, a side elevation of same. Fig. 9 is a plan view of the belt-shifter and its braking apparatus. Fig. 10 is a front elevation of platen, grippers, frisket, and jointed connection. Fig. 11 is a side elevation of the parts shown in Fig. 10. Fig. 12 is an enlarged and detailed view of some of the parts shown in Fig. 11. Fig. 13 is an enlarged and detached view of parts shown in Fig. 10. Fig. 14 is a side elevation of the bed, its toggles, and link. Fig. 15 shows a modification of my combined brake and shifting device.

My invention consists in the following parts and combinations, as hereinafter specified and claimed, wherein A is any suitable frame, so constructed and fashioned as to permit of the proper adjustment and operation of the various parts of my device. A¹ is that end of the frame A upon which are provided the toggles, as will hereinafter more fully appear. A² is that end of the frame opposite the end A¹. B are two parallel bars or rods, which not only

serve to indirectly resist the tension brought upon the operating parts, but also act in combination with other portions of the device to serve as guides and directors for the bed.

I do not narrowly limit myself to the precise construction and number of the rods B, as herein shown, as it would be possible to construct the machine with one, two, or possibly more of these rods. C is the bed upon which rests the type. C¹ C² are the arms of a toggle-lever, arranged to actuate the bed C. The arm C² of said toggles is pivoted to the shaft A³. C³ is a connecting-rod uniting the crank C⁷ of the shaft C⁶ with the toggles C¹ C². C⁴ is a gear-wheel, operated by the pinion H¹ of the shaft H, to which shaft the power is applied by means of pulleys or their equivalents. C⁵ is an arm, one extremity of which is pivoted to the frame A, while the other is journaled or pivoted to the projection or arm of the bed C. The attachment of the arm C⁵ to the bed-frame C is made in such a manner as to convert the bed C into a lever of the first order, the fulcrum of which is at the shaft *c*, the power at the attachment-arm C⁵, and the weight at the face of the bed. *c* is a fixed and immovable shaft, proceeding from the sliding boxes *c'*, which travel along the parallel bar B. The shaft *c* carries the bed C, which revolves upon it in the operation of the device. D is a platen; D¹, its bed or frame, which is provided with any suitable device, such as set-screws or the like, whereby the platen may be suitably adjusted to receive a perfect impression upon the paper to be printed. D² is a cylinder, rigidly fixed to the frame D¹ of the platen, and at a suitable angle to the plane of its face, for the purpose which will hereafter more fully appear. Within this cylinder D² operates the piston or plunger D³, which is already pivoted to the link D⁵, by which connection is made with the sliding boxes *c'*; also to the stop or lock piece D⁴, which is loosely pivoted to the frame A, or which may be fixed upon a suitable shaft. This lock-piece D⁴ is formed substantially as shown in the drawings, and provided with a projection of such dimension and contour as that it shall act to fix the frame of the platen

firmly and rigidly in a perpendicular position, and there hold it while an impression is being taken.

The operation of this feature is shown in detail in Fig. 6 of the drawings.

It will be understood that this lock-piece D^4 has its main body directly connecting with the piston D^3 , while its arm projects forward and upward at as suitable angle to bring itself up against the back of the platen, as the latter assumes a vertical position.

A rigid support is thus furnished the platen in taking an impression formed by the combined action of the shafts d and I .

d is a shaft journaled in the end A^2 of the frame A , upon which operates the frame D^1 of the platen. d^1 is a lug or projection extending from the platen D , and terminating in a joint at the head of the spring E . d^2 are griper or frisket fingers attached to the bar E^2 , which, in its turn, is also hinged to the spring E . As shown in detail at Figs. 11 and 12 of the drawings, there is provided at the joint d^3 , which connects the spring E and the frisket-bar E^2 , a device whereby the joint d^3 may be permitted to operate or be fixed rigidly. This is accomplished by opposing blocks or lugs upon each leaf of the hinge. A pin is made to connect them when the joint is desired to be rigidly fixed. By withdrawing the pin the joint is permitted to operate and the grippers d^2 allowed to fall upon the platen.

F is the frame carrying the inking mechanism, which may be adjusted by being fixed at any desired point along the parallel bars B , along which it slides by the accommodation of the collar f^1 , as shown in Fig. 7. F^1 is the plate upon which ink is distributed. This may be in the shape of a rotating disk, if desired, and the usual appliances adopted for operating it. F^2 is a shaft which operates the inking mechanism. F^3 is an angular lever operating in connection with the action of the shaft F^2 , to which it is attached. The short arm of the lever F^3 is connected by the link F^6 to the crank C^8 of the main shaft C^6 , to which power is applied, as heretofore stated. The longer arm of the lever F^3 is pivoted to the link F^4 , which connects the lever F^3 with the roller carriage or frame F^5 . f is a truck or way, upon which travel the inking-rollers after they have passed beyond the ink-plate F^1 , after leaving which, they are supported upon the projecting pieces f^3 of the bed C . f^2 represents the inking-rollers operating in the frame or carriage F^5 .

G is a collar provided with a set-screw or other suitable clamping apparatus, whereby it may be fixed upon the cross-piece G^1 , which extends between and connects the arm F^3 and F^4 in such a manner as that when the arm F^3 is operated it shall carry with it the parts just mentioned. G^2 are two springs coiled in opposition to each other, and placed upon the cross-piece G^1 on either side of the collar G .

Each spring G^2 is fastened at one extremity to the collar G , and at the other end to the arm F^3 , by which arrangement it will be apparent that by a simple loosening and turning of the collar G upon the cross-piece G^1 the spring G^2 might be fixed at any degree of tension by setting or clamping the collar G upon the cross-piece G^1 .

H is the driving-shaft of the device, provided with its governing-wheel H^2 . This shaft is driven by pulleys in the usual manner, and it in turn operates the main shaft of the machinery through the engagement of its pinion H^1 with the gear-wheel C^4 . If it is desired to operate the device without the assistance of steam-power, this may be accomplished by operating the treadle H^3 , which is made to connect with and operates the driving-shaft H in any suitable manner.

I is the shaft of the belt-shifter and braking apparatus. This shaft is operated by means of the lever I^1 . The lever I^1 is one of the first order, with its fulcrum at the shaft I , its weight being the belt shifting and braking device. The lower arm of the lever I^1 is provided with a slot, which accommodates a lug proceeding from the angle-piece I^2 . This angle-piece is pivoted at i , and terminates in fingers or equivalents thereof for embracing the belt, so as to shift it alternately from the idle pulley to the operating pulley of the shaft H . Upon the extremity of the shaft, opposite the lever I^1 , is fixed the arm I^3 , to which is attached any suitable rubber or brake for impinging against the periphery of the governing-wheel H^2 .

Operation: Power is originally applied to the shaft H , either through its pulley or by the treadle H^3 . Proceeding, first, to describe the operation of the device as regards the bed C , it will be noticed that the power is transmitted through the pinion H^1 , and gear-wheel C^4 , to the crank C^7 of the shaft C^6 , whereby, through the medium of the connecting-rod C^3 , reciprocal motion is imparted at the union of the toggle $C^1 C^2$. The operation of the arm C^2 , swinging as it does from its pivot or shaft A^3 , is merely to impart a circular motion at the junction of the toggles $C^1 C^2$. As the crank C^7 rises the operation of the connecting-rod and toggles just mentioned is to cause the bed C to travel toward the end A^2 of the frame, while at the same time bringing said bed from its inclined to a vertical position. This movement and operation of the bed C is owing not only to the operation of the parts just mentioned, but also to an influence exerted by the arm C^5 , which, as it is brought toward the vertical position by the passage of the bed C along the rods B toward the end A^2 , forces up the arm of the bed C to which it (the arm C^5) is attached, so that when the crank C^7 has reached its upper maximum the face of the bed C shall be vertical.

The operation of the platen D , and its ac-

companying and neighboring parts, is as follows: Power is transmitted from the crank C^7 , through the connecting-rod C^3 and the toggle C^1 and the bed C , to the shaft c . This shaft connects the sliding boxes or collars c' , which move upon the parallel rods B . The reciprocating motion of the sliding collars c' is transmitted through the link D^5 to the piston D^3 . This piston operates within the hollow cylindrical arm D^2 , which is fixed to or is a part of the frame D^1 of the platen. By the provision of the cylinder and piston D^2 and D^3 , and the connections just mentioned, the reciprocal motion of the sliding collar c' imparts an oscillating motion both to the platen D , and to the locking-piece D^4 by means of the single joint or connection uniting the link D^5 , piston D^3 , and locking-piece D^4 , as shown in Fig. 3 of the drawings.

By the arrangements of parts just mentioned it is evident that the platen D receives its motive power directly from and in concert with the bed C in such a manner that when the bed C has been brought to its vertical position the platen D will present appositely and in a vertical position. In other words, the faces of the bed C and platen D will meet and abut on the same vertical plane so that an impression or print will be made between them in the ordinary manner. Upon the frame of the bed C and the end of A^2 are provided counterpart lugs and recesses, or the equivalent thereof, which serve as a guard to the bed C , and as a means of securing it in a firm vertical position while an impression is being taken.

Referring now to the gripping apparatus, (shown particularly in Figs. 3, 10, 12, and 13 of the drawings,) it will be noticed that the spring E , which is attached to the frame A , terminates in two joints or hinges, d^1 d^3 . At the foot of the platen D the joint d^3 , as hereinbefore described, is provided merely for convenience in setting or adjusting the fingers of the frisket. This joint is not intended to operate during the process of printing, and it is therefore locked and may be operated by the provision of the blocks and pins or their equivalent device hereinbefore specified.

As the platen D is made to assume its vertical position the spring E is forced down, while the fingers of the frisket are always maintained in the vertical position, meeting the sheet to be printed at the moment of impression. When the impression has been taken, and the platen and bed are removed from the frisket, the printed sheet is removed from the type by the action of the fingers of the frisket, when it may be delivered or removed in any suitable manner, to make room for the next sheet.

The operation of the inking mechanism is as follows: A crank, C^8 , of the shaft C^6 , imparts a rocking motion to the angular lever F^3 through the link F^6 . The angular lever

F^3 is pivoted to the frame F at F^2 , as shown in detail at Fig. 8 of the drawings. The rocking motion imparted to the lever F^3 is transmitted through the link F^4 to the carriage or frame F^5 of the inking-rollers, whereby said rollers are carried to and fro over the inking-plate and the type upon the bed C . The function of the springs G^2 is to retain the inking-rollers in constant actual contact both with the inking-plate F^1 and the type. The springs G^2 , connected as they are to the lever F^3 and the collar G , can be set to any desired degree of tension by simply turning the collar G upon the cross-piece G^1 . The operation of this spring is not only to retain the rollers in constant contact with the proper surfaces, but further to cause a stronger or firmer pressure and contact to be made upon the face of the type than upon the surface of the inking-plate, inasmuch as the tension is increased upon the spring G^2 as the rollers advance toward the bed C , while it is relaxed upon their return to the inking-plate F^1 , at which point a lighter degree of pressure is desired.

To prevent the inking-rollers from dropping after leaving the plate F , the track or way f is provided, as shown in Fig. 3, after leaving which the rollers are received upon a support projecting from the bed C , over which it is conducted to the face of the said bed.

Proceeding now to my arrangement of shifting the belt from the operating pulley to the idle pulley, and applying a brake to the machinery, it will be noticed that I accomplish both of these operations by one motion of the single lever, whereby the power is dismissed.

My combined shifter and brake consists essentially of a shaft or connection, I , operated by a suitable handle or lever, I^1 , the manipulation of which shall operate at a single motion, whereby the power may be dismissed, and the brake applied, or vice versa. One form of belt-shifter, as shown in this application, consists of the shaft I , operated by the lever I^1 , the arm of which lever beyond the handle portion is provided with a slot for the accommodation of the lug entering it from the angular belt-shifter I^2 , which is pivoted at i , as shown in Fig. 2 of the drawings. The motion transmitted to the angular piece I^2 will act alternately to shift the belt from one pulley to the other upon the shaft H .

As shown in Fig. 2, W represents the working pulley, its neighbor being the idle pulley. The belt-shifter, as there shown, would cause the belt to operate upon the working pulley. In this position it will be seen that the brake I^3 is released. Now, if the lever I^1 should be reversed, the belt will be shifted to the idle pulley, and the power thus dismissed from the machine, while at the same time and by the same operation the brake I^3 will be applied.

What I claim is—

1. In a printing-press, the combination, with rods B , of slides provided with hubs that serve

as bearings for the actuating-shaft of the platen, substantially as and for the purpose described.

2. The combination, with the bed C, rods B, and toggle-lever C¹ C², of the arms C⁵, attached to a rock-shaft journaled in the press-frame, substantially as and for the purpose specified.

3. The combination, with the oscillating platen D, of the lock-piece D⁴, arms D⁵, and slides C¹, substantially as and for the purpose specified.

4. The combination of the bed C and its bearings, with the guide-rods B and the arm or link C⁵, substantially as and for the purpose shown.

5. The combination of the frame A, the bed C and its bearings, the arm C⁵, the toggle C¹ C², the pitman C³, and the crank of any suitable driving-shaft, substantially as and for the purpose shown.

6. In combination with the oscillating bed or platen of a printing-press, a cylinder, D², and its piston D³, operated by suitable mechanism for imparting a reciprocating motion to the said piston, substantially as and for the purpose described.

7. The combination of the sliding collar c', link D⁵, cylinder and piston D² D³, and the locking-piece D⁴, substantially as and for the purpose shown.

8. In combination with the frisket-bar E², the spring E provided with the lock-joint d³, substantially as and for the purpose described.

9. The combination of the shaft to which are attached the arms carrying the inking-rollers, of one or more springs G², and an adjusting-collar, whereby the tension of the spring may be regulated as desired, substantially as and for the purpose specified.

10. The combination, with the bed C provided with extended ways f³, of the plate F¹ and stationary ways, arranged outside of the ways f³, whereby the latter may pass between and below the stationary ways, as the bed is actuated, substantially as and for the purpose specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES RICHARDS.

Witnesses:

H. T. HOWER,

FRANCIS TOUMEY.